



Electricity Technologies in a Carbon-Constrained World

CEO Conference - Macau

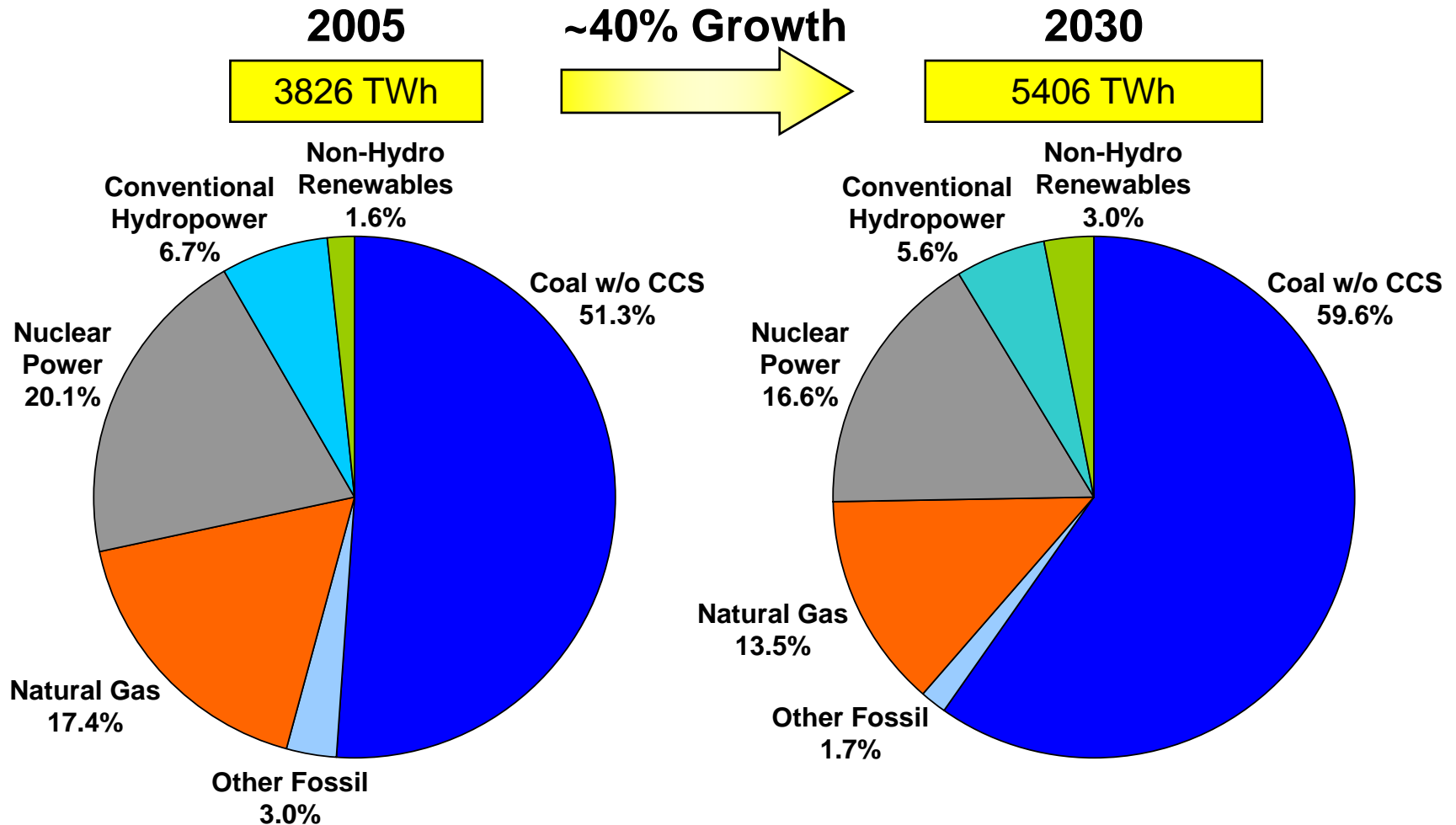
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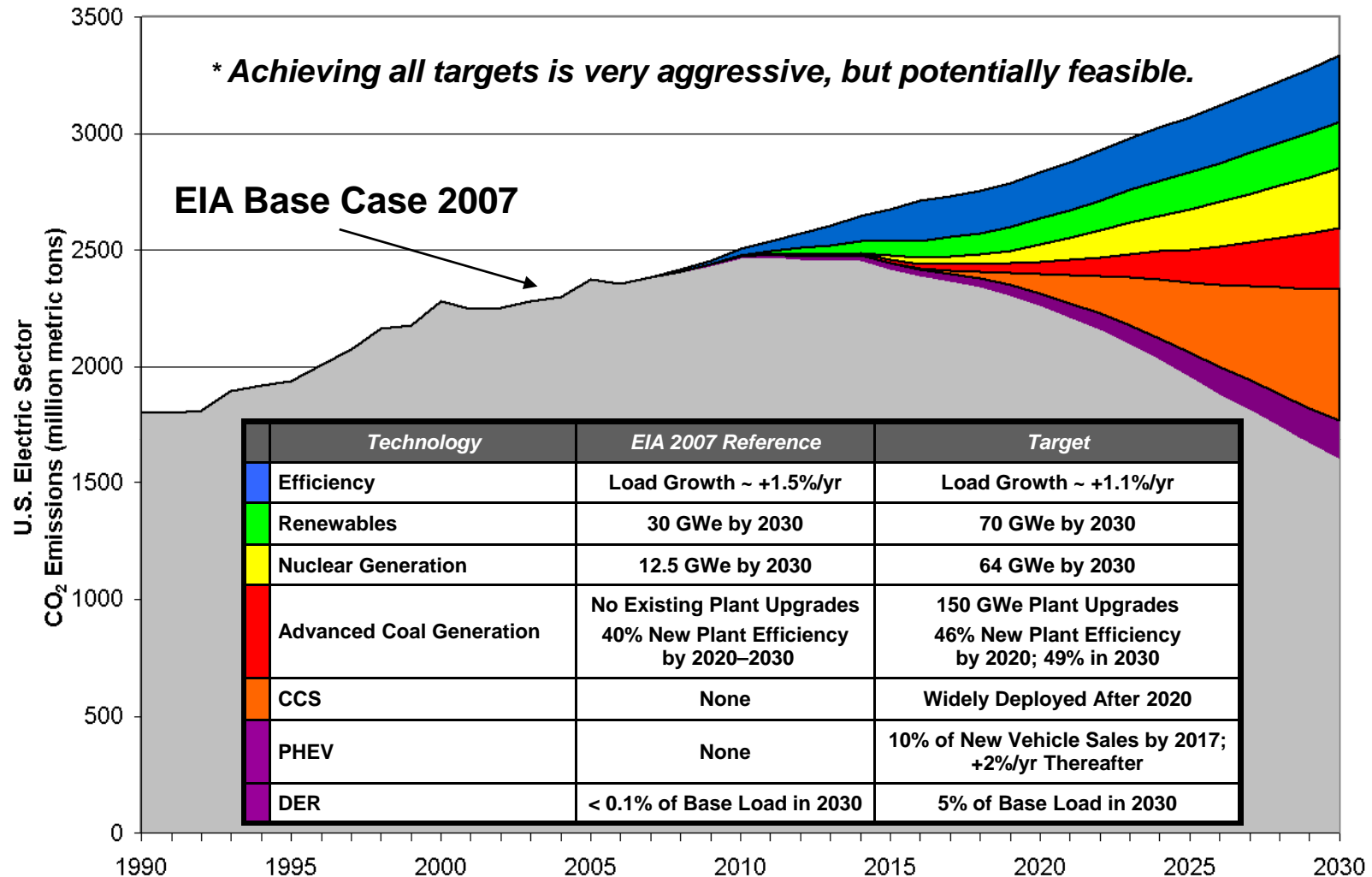
U.S. Electricity Generation Forecast*



* Base case from EIA "Annual Energy Outlook 2007"

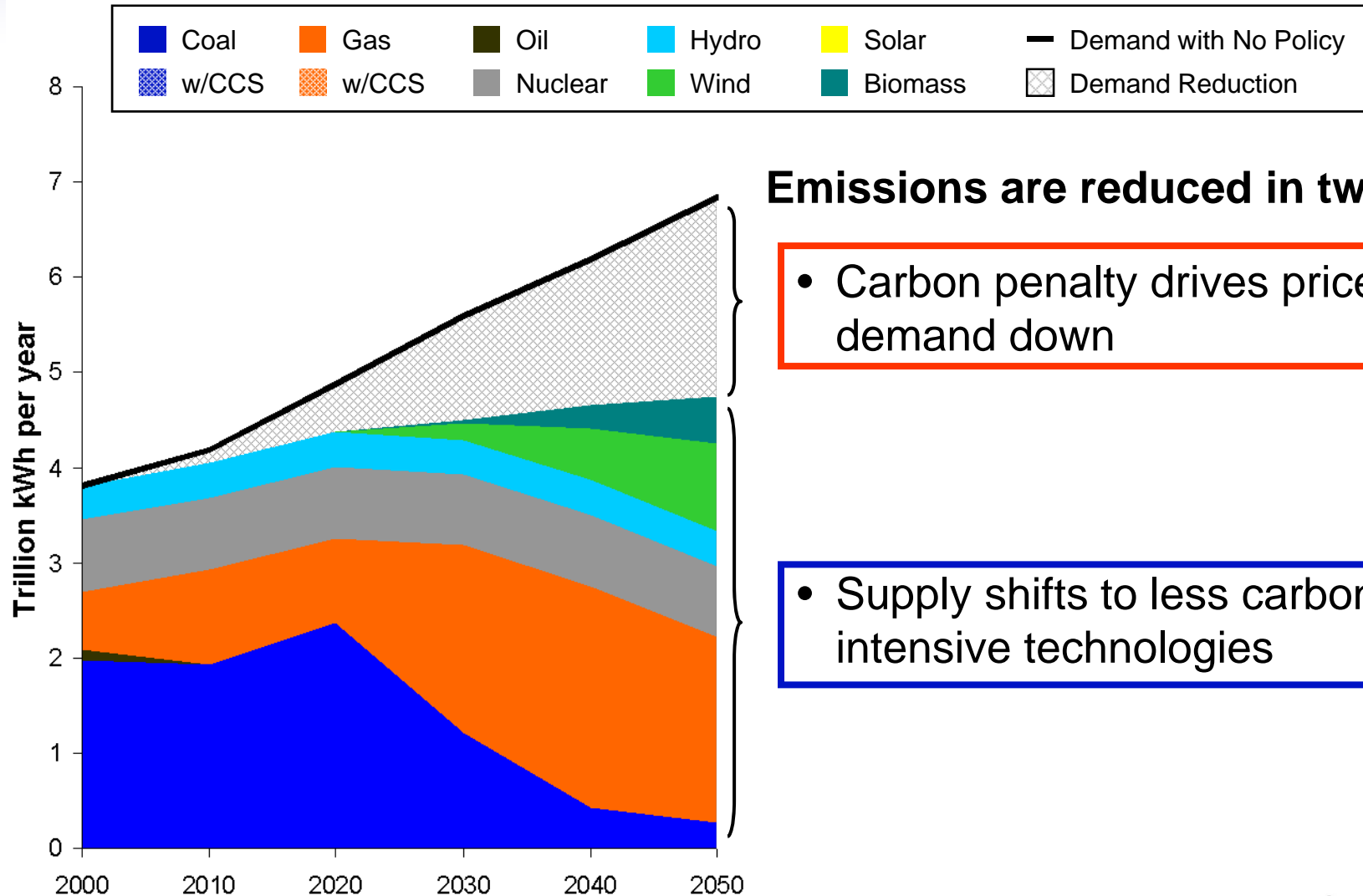
With accelerated deployment of advanced electricity technologies, how quickly could the U.S. electric sector cut its CO₂ emissions?

Electric Sector CO₂ Reduction Potential



What is the potential value of these advanced electricity technologies to the U.S. economy and to consumers?

U.S. Electric Generation: Limited Portfolio

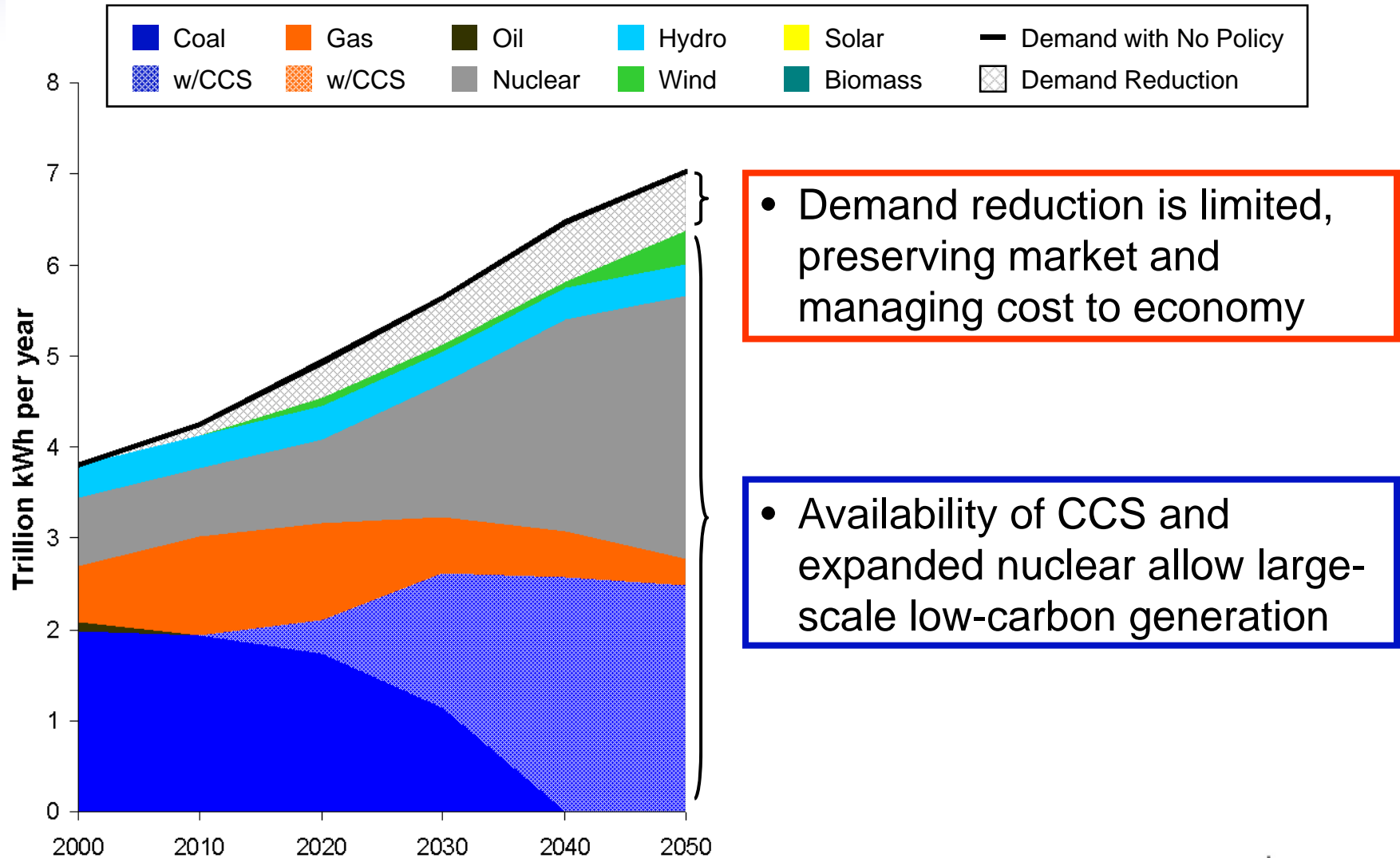


Emissions are reduced in two ways:

- Carbon penalty drives price up, demand down

- Supply shifts to less carbon-intensive technologies

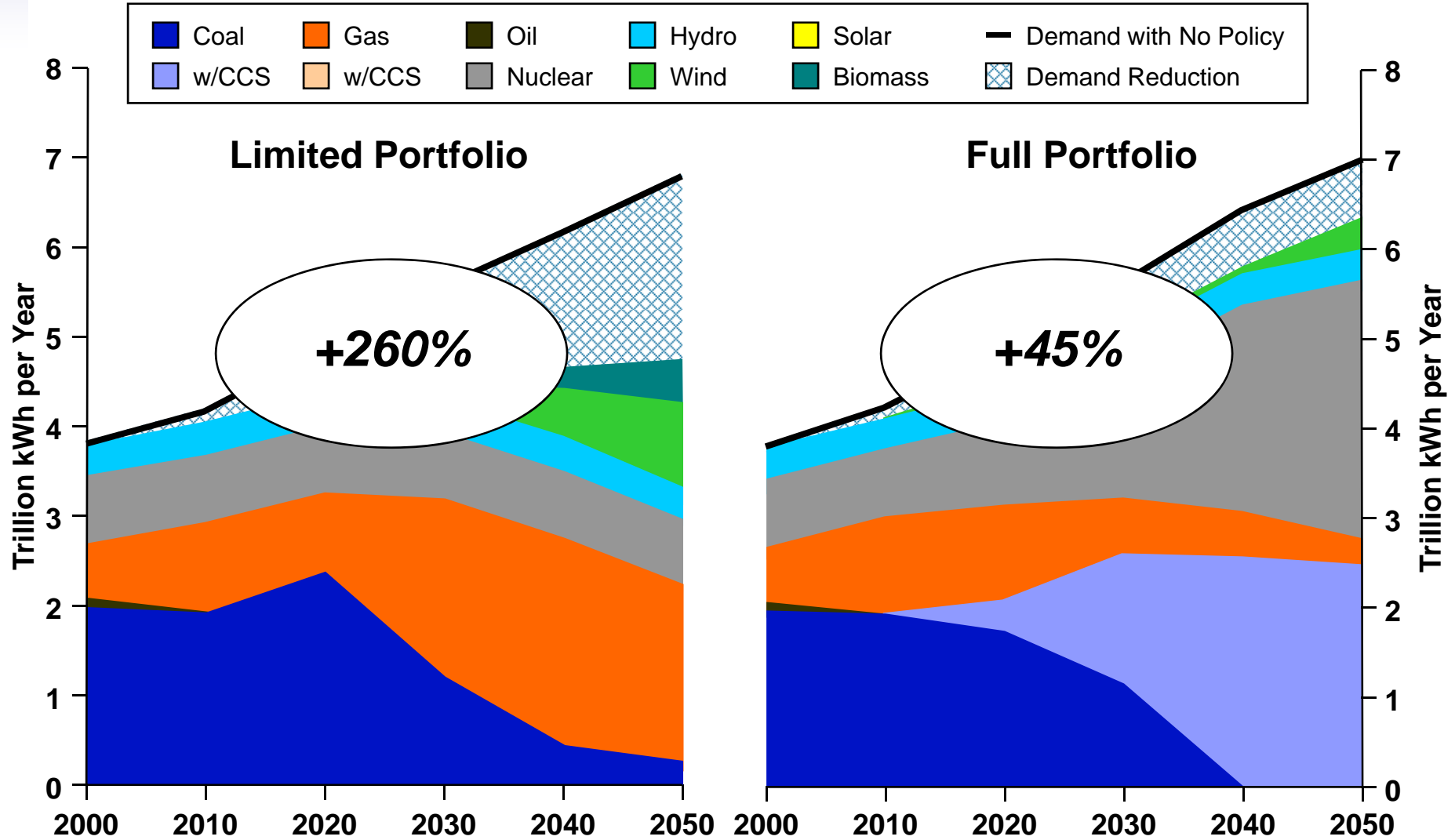
U.S. Electric Generation: Full Portfolio



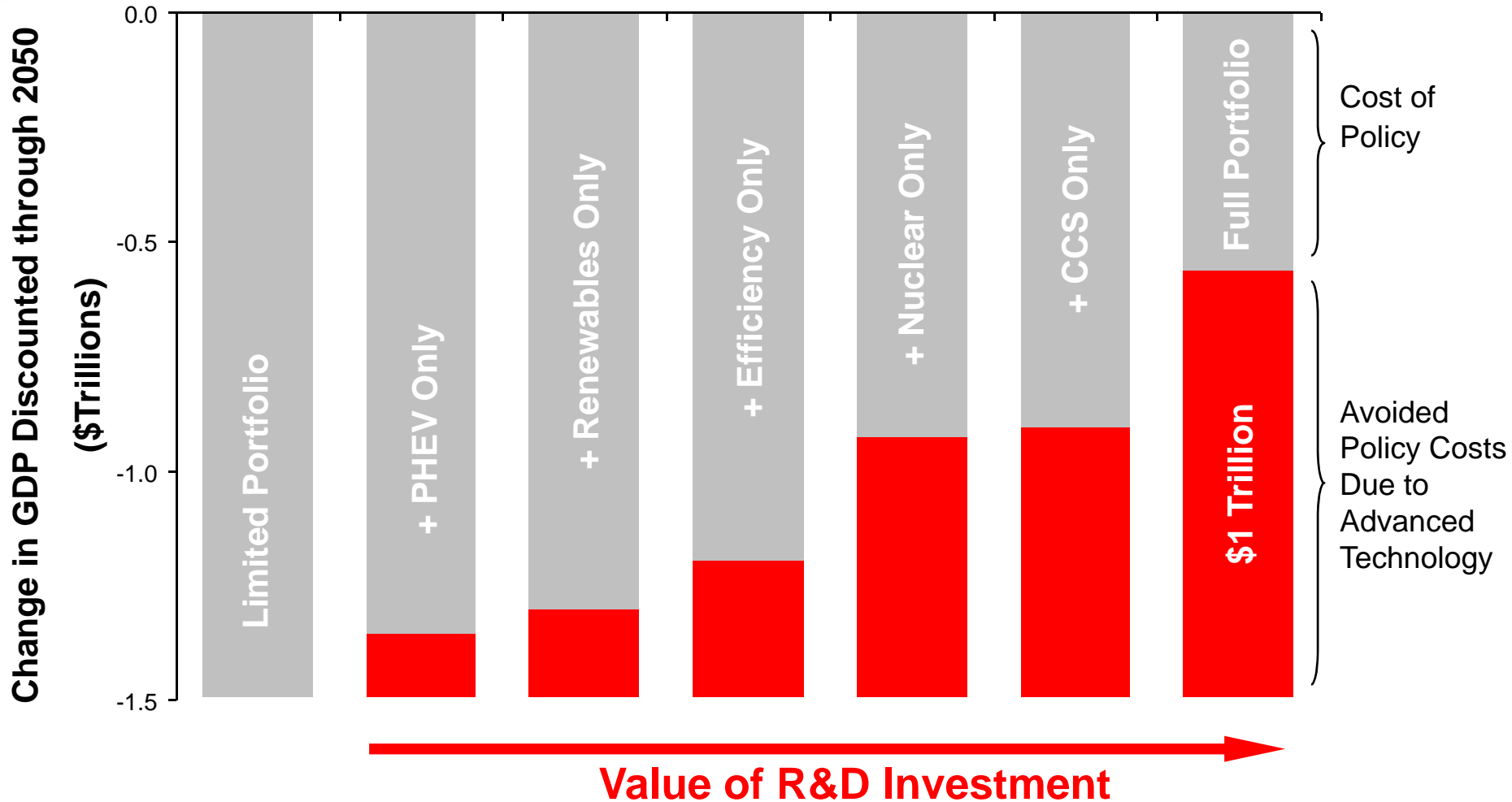
• Demand reduction is limited, preserving market and managing cost to economy

• Availability of CCS and expanded nuclear allow large-scale low-carbon generation

Increase in Real Electricity Prices...2000 to 2050



Impact on U.S. Economy



Key Technology Challenges

- **Smart grids and communications infrastructures** to enable end-use efficiency and demand response, distributed generation, and PHEVs.
- **Transmission grids and associated energy storage infrastructures** with the capacity and reliability to operate with 20–30% intermittent renewables in specific regions.
- **Advanced light-water reactors** enabled by continued safe and economic operation of the existing nuclear fleet; and a viable strategy for managing spent fuel.
- **Coal-based generation units with CCS** operating with 90+% CO₂ capture and with the associated infrastructure to transport and permanently store CO₂.

EPRI Study Conclusions for the U.S.

- The technical potential exists for the U.S. electricity sector to significantly reduce its CO₂ emissions over the next several decades.
- No one technology will be a silver bullet – a portfolio of technologies will be needed.
- Much of the needed technology isn't available yet – substantial R&D, demonstration is required.
- A low-cost, low-carbon portfolio of electricity technologies can significantly reduce the costs of climate policy.